Drones being honed to help farmers grow better crops

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Dr. Juan Enciso, a Texas A&M AgriLife Research irrigation engineer in Weslaco, examines sensors that will one day be mounted on drones to evaluate crops. (AgriLife Communications photo by Rod Santa Ana)

Farmers will be using drones in the near future to monitor and improve

their crops to help feed a hungry world, say Texas A&M AgriLife Research scientists who are now developing the technology.

"Unmanned aerial vehicles, or drones, will soon play a major role in meeting the challenges of feeding a growing global population," said Dr. Juan Enciso, an AgriLife Research irrigation engineer in Weslaco.

"One day, flying a UAV will be a routine task an agricultural producer performs on a regular basis to help him efficiently maintain his crops, improve yields and optimize resources, especially water," he said.

The sensors being tested are on a platform mounted on a tractor, but eventually will be transferred to a drone.

"The data is transmitted to web-based computer programs, some of which already exist, that can help a grower make decisions about when and where to perform farming practices, like irrigating, fertilizing or using insecticides," he said.

Preliminary research has already shown promise in using advanced sensor technology in agriculture.

"Data shows that this technology can help farmers detect water and insect stresses and increase water-use efficiency," he said. "And as technology continues to develop, a grower will be even better informed about the crop he's growing."

Crop breeders seeking specific traits in developing drought tolerant crop varieties, for instance, can also make quick, inexpensive and precise assessments to help pick the best plants from the many thousands being evaluated, Enciso said.

"The amount of time spent evaluating individual plants would be

drastically reduced, which would greatly accelerate the time it takes to develop improved varieties."

Sensors currently being evaluated for use on mobile platforms include ultrasound sensors to measure plant height, infrared thermometers to measure plant and soil temperatures and hyperspectral sensors to measure relative leaf water content. There are also other sensors to measure what is called normalized difference vegetation index, or NDVI, to determine how well a plant canopy is performing photosynthesis.

"The next step in this research is to identify exactly which sensors are needed, which can be combined, then make them light enough to be carried by a drone," Enciso said. "We could then run economic assessments to determine exactly how much cheaper it is to fly over a crop than to do it on a tractor."

Data gathered by drones would be applied to web-based programs that a grower could see on his iPhone or other mobile device.

"That farmer could then compare what he's seeing in the field with what the application is telling him to do," Enciso said. "The idea is to make the decision-making process easier for the farmer while optimizing his resources to get better yields and increase profitability."

Dr. Juan Landivar, director of the Texas A&M AgriLife Research and Extension Centers in Weslaco and Corpus Christi, said UAVs are not meant to replace farm managers or crop consultants, but to improve information available to them.

"UAVs are valuable tools to readily and accurately produce geo-reference field information for the management of crops," he said. "Anybody tasked with growing a crop will be provided with valuable

field information to make smarter management decisions."

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